Amended Claims

1. (Currently Amended) Method of ~~improving~~ performing an aesthetic or medical treatment which is bodily safe to ~~safety of~~ bystanders exposed to a monochromatic treatment light source, comprising the steps of:

a) providing ~~a~~ an eye-hazardous monochromatic treatment light source ~~with a distal end~~;

b) attaching a diffusing unit to the distal end of said light source, said diffusing unit including at least one diffusively transmitting element which is transparent to said light and constitutes an extended diffused source when exposed to said light;

c) positioning said distal end at a predetermined location substantially in contact with an outer surface of a target, said location being suitable for effecting an aesthetic or medical treatment;

d) firing said monochromatic treatment light;

e) causing said monochromatic light to scatter ~~diverge~~ at said distal end such that the radiance of the light exiting said distal end is an eye safe level; and

f) allowing said scattered light to propagate to said target so as to effect an aesthetic or medical treatment,

whereby at a first position of said distal end relative to ~~a~~ said target corresponding to said predetermined location the energy density of an exit beam from said distal end is ~~substantially equal to the energy density of the monochromatic light~~ suitable to effect said treatment and at a second ~~seconds~~ position of the distal end relative to, and above, said ~~a~~ target the energy density of the scattered light emitted from said distal end is significantly less than the energy density ~~of the monochromatic light~~ which is suitable to effect said treatment.

2. (Canceled) ~~Method of claim 1, further comprising a) providing a diverging unit transparent to the monochromatic light unit comprising at least one focusing lens, a plurality of reflectors and a distally positioned plate transparent to the monochromatic~~

~~light; b) attaching said diverging unit to the distal end of the monochromatic light source; c) focusing the monochromatic light onto at least one of said reflectors; and d) allowing light rays to exit said plate at varying angles, depending on the number of times reflected by said reflectors, whereby to cause said monochromatic light to be divergent~~.

3. (Canceled) ~~Method of claim 1, further comprising the steps of scattering the monochromatic light, said scattered monochromatic light being divergent~~.

4. (Canceled) ~~Method of claim 3, further comprising: a) providing a diffusing unit with a distal end, said diffusing unit comprising at least one diffusively transmitting element, wherein each of said diffusively transmitting elements is transparent to the monochromatic light; b) attaching said diffusing unit to the distal end of the monochromatic light source; and c) allowing the monochromatic light to be scattered by each of said diffusively transmitting elements~~.

5. (Canceled) ~~Method of claim 3, further comprising: a) providing a diffusing unit transparent to the monochromatic light comprising an angular beam expander and at least one diffuser; b) attaching said diffusing unit to the distal end of the monochromatic light source; and c) allowing the monochromatic light to propagate through said angular beam expander and said at least one diffuser, whereby to scatter said monochromatic light.~~

6. (Currently Amended) Method of ~~claim 3, further comprising the following steps:~~ improving bodily safety of bystanders exposed to a monochromatic light source, comprising:

a) providing a monochromatic light source with a distal end;

b) providing a diffusing unit with a plurality of diffusers at said distal end, wherein at least one of said diffusers is axially displaceable;

c ~~b~~) axially displacing said at least one axially displaceable diffuser to an active position such that each diffuser is substantially in contact one with the other, whereby the energy density of an exit beam from said diffusing unit is substantially equal to the

energy density of the monochromatic light at the first position of the distal end of the monochromatic light source; and

d ~~e~~) axially displacing said at least one axially displaceable diffuser to an inactive position such that each diffuser is separated one from the other by a gap large enough to generate a sufficiently large scattering angle such that the energy density of the light emitted from said diffusing unit at the second position of the distal end of the monochromatic light source is significantly less than the energy density of the monochromatic light.

7. (Currently Amended) Method of claim ~~1~~ 6, wherein the first position is substantially in contact with a target to which the monochromatic light is directed.

8. (Cancelled) ~~Method of any of claims 1 to 6, wherein the radiance of the divergent monochromatic light is less than 14 J/cm^2/sr~~.

9. (Currently Amended) Method of ~~any of claims~~ claim 1 ~~to 6~~, wherein the radiance of the ~~divergent~~ scattered monochromatic light is less than 10*k1*k2*(t^1/3) J/cm^2/sr, where t is a laser pulse duration in seconds, k1=k2=1 for a wavelength ranging from 400 to 700 nm, k1=1.25 and k2=1 for a wavelength of approximately 750 nm, k1=1.6 and k2=1 for a wavelength of approximately 810 nm, k1=3 and k2=1 for a wavelength of approximately 940 nm, and k1=5 and k2=1 for a wavelength ranging from 1060 to 1400 nm.

10. (Currently Amended) Method of claim 1, further comprising measuring the radiance of the ~~divergent~~ scattered monochromatic treatment light and issuing a warning as a result of a mishap if the radiance of the ~~divergent~~ scattered monochromatic light is greater than a predetermined safe value.

11. (Currently Amended) Method of claim 1, wherein the eye hazardous monochromatic light is selected from the group consisting of collimated laser beam, convergent laser beam, concentrated multiple laser beams and fiber guided laser beam.

12. (Currently Amended) Method of claim 9 ~~11~~, wherein the monochromatic light source is selected from the group consisting of Excimer, Dye, Nd:YAG 1064, 1320 and 1440 nm, frequency doubled Nd:YAG laser, Ruby laser, Alexandrite laser, Diode lasers ~~including diodes~~ operating at a wavelength of 810 to 830 nm, 940 nm, and 1450 nm, stack of diode laser ~~diodes~~, LICAF laser, Er:Glass laser, Er:YAG laser, Er:YSGG laser, CO_2 laser, isotopic CO_2 laser and Holmium laser ~~lasers~~.

13. (Currently Amended) Method of claim 9 ~~1~~, wherein the monochromatic light is provided with a wavelength ranging from 308 to 1600 nm or between 1750 nm to 11.5 microns ~~and the energy density level of the monochromatic light source ranges from 0.01 to 2000 J/cm^2~~.

14. (Currently Amended) Method of claim 12, wherein the monochromatic light source is a plurality of monochromatic diodes.

15. (Original) Method of claim 1, wherein the bodily safety includes eye safety, skin safety and environmental safety.

16. (Canceled) ~~Method of claim 1, wherein the exit beam at the first position is used in applications selected from the group of cosmetic applications, medical applications and industrial applications~~.

17. (Currently Amended) Method of claim 1, wherein the aesthetic or medical treatment is ~~exit beam at the first position is used in applications~~ selected from the group consisting of hair removal, coagulation of blood vessels located on a face or legs, treatment of rosacea, tattoo removal, removal of pigmented lesions in the skin, skin rejuvenation, treatment of psoriasis, treatment of acne, treatment of skin pigmented with porphyrins or Cyanine green, treatment of fat, skin resurfacing, skin vaporization, collagen contraction, dental applications, removal of pigments from the gums, teeth whitening, dermatology, gynecology, podiatry, urology, and reduction of pain ~~laser~~

~~welding of transparent plastic materials, surface treating of materials, laser annealing, evaporation of paint and ink stains and cleaning of buildings, stones, antique sculptures and pottery~~.

18. (Currently Amended) Method of claim 1 [4], wherein a laser beam exiting a diffusively transmitting element is controllably repositionable to scan targets ~~of the diffusively transmitting element~~.

19. (Original) Method of claim 18, wherein the sequence of targets to be impinged by the laser beam is programmable.

20. (Currently Amended) Method of claim 1 [4], further comprising the ~~following steps: : providing the diffusing unit with a clear transmitting element such that a gap is formed between a diffusively transmitting element and said clear transmitting element, the diffusively transmitting and clear transmitting elements being transparent to the monochromatic light, placing said clear transmitting element on a target skin location, directing the monochromatic light to said target skin location and~~ step of cooling a skin ~~within said gap~~ target during generation of the treatment light.

21. (Canceled) ~~Method of claim 1, wherein a half angle of a divergent exit beam at the first position exceeds 6 degrees.~~

22. (Canceled) ~~Method of claim 4, wherein a half angle of a divergent exit beam at the first position exceeds 42 degrees.~~

23. (Currently Amended) Method of claim 1, wherein the monochromatic light is pulsed with a pulse duration ranging from 10 nanosecond to 1500 msec, the energy density level of the monochromatic light source ranges from 2 to 90 J/cm^2, and the diffusing unit has a diameter of greater than 3 mm ~~the duration of a laser pulse ranges from 1 nanosecond to 1500 msec, and the diameter of a spot size ranges from 1 to 20 mm~~.

24. (Original) Method of claim 23, wherein a series of pulses is generated.

25. (Currently Amended) Method for converting ~~a~~ an eye-hazardous laser unit suitable for aesthetic treatment or medical treatment ~~or industrial treatment~~ into an eye safe laser unit, comprising the steps of:

a) providing a diffusing unit comprising at least one planar diffusively transmitting element longer than 3 mm which is transparent to light emitted by an eye-hazardous laser unit suitable for aesthetic treatment or medical treatment;

b) attaching ~~a diverging optical~~ said diffusing unit to the distal end of said ~~a~~ laser unit;

c) firing said laser unit; and

d) allowing said ~~monochromatic~~ light to propagate through said diffusing unit, thereby generating a non-coherent and extended diffused source of light from said unit at a sufficiently low radiance value such that said source of light is eye safe to bystanders exposed to said ~~a monochromatic~~ light ~~source~~ and of a sufficiently high energy density level at said distal end to effect said aesthetic ~~a~~ treatment or medical treatment when said distal end is essentially in contact with a target. ~~location to effect said aesthetic treatment, medical treatment or industrial treatment.~~

26. (Canceled) ~~Method of claim 25, wherein the unit is a divergent diffusing optical unit.~~

27. (Canceled) ~~Method of cooling skin which is irradiated with monochromatic light, comprising: a) providing a monochromatic light source with a distal end; b) providing a unit with two transmitting elements that are transparent to monochromatic light, such that a gap is formed between said two elements; c) attaching said unit to the distal end of the monochromatic light source; d) placing said unit on a skin location to be treated; e) providing means for skin cooling, said skin cooling means being disposed within said gap; f) allowing monochromatic light to propagate through said unit to said skin location, the temperature of the skin location to be treated thereby increasing; and g) allowing said skin cooling means to cool said skin location.~~

28. (Canceled) ~~Method of Claim 27, further comprising the following steps: a) providing the unit with a diffusively transmitting element and with a clear transmitting element distally positioned with respect to said diffusively transmitting element; b) allowing the monochromatic light to be scattered by said diffusively transmitting element, whereby the energy density of an exit beam from said clear transmitting element is substantially equal to the energy density of the monochromatic light; and c) repositioning the unit from the target to a predetermined position at which the energy density of an exit beam from said diffusively transmitting element is significantly less than the energy density of the monochromatic light.~~

29. (Canceled) ~~Method of claim 28, wherein the skin cooling means is fluid transparent to the monochromatic light, said fluid flowing through a conduit inserted within the gap~~.

30. (Canceled) ~~Method of claim 29, wherein the fluid is in fluid communication with an external cooler.~~

31. (Canceled) ~~Method of claim 27 or 28, wherein the skin cooling means is a thermoelectric cooler, the thermoelectric cooler operative to cool the lateral sides of the transmission element placed on the skin location to be treated.~~

32. (Canceled) ~~Method of improving eye safety during exposure to a monochromatic light source, comprising: providing a monochromatic light source and generating a visible flash prior to the emission of a pulse of monochromatic light, thereby inducing an eye of a bystander to blink or to change its field of view in order to avoid staring at the monochromatic light.~~

33. (Canceled) ~~Method of claim 32, wherein the generation of the visible flash is synchronized to the timing of the emission of the monochromatic light pulse.~~

34. (Canceled) ~~Method of claim 33, wherein the duration of the pulse is shorter than an eye blinking response time~~.

35. (Canceled) ~~Method of claim 34, wherein the monochromatic light source is suitable for hair removal, photorejuvenation or treatment of vascular lesions~~.

36. (Currently Amended) Aesthetic or medical treatment apparatus ~~or improving bodily safety of bystanders~~ which is bodily safe to bystanders exposed to a monochromatic light source, comprising: ~~a~~ means attached to the distal end of an eye hazardous ~~a~~ monochromatic treatment light source, said means adapted to cause the monochromatic light to be divergent, whereby at a first position of said distal end corresponding to a predetermined location substantially in contact with an outer surface of ~~relative to~~ a target the energy density of an exit beam from said distal end is suitable for effecting an aesthetic or medical treatment ~~substantially equal to the energy density of the monochromatic light~~ and at a second position of said distal end relative to, and above, said ~~a~~ target the energy density of the light emitted from said distal end is significantly less than the energy density of the monochromatic light which is suitable for effecting said treatment,

wherein the radiance of the divergent monochromatic light is less than $10*k1*k2*(t^{1/3})$ J/cm^2/sr, where t is a laser pulse duration in seconds, k1=k2=1 for a wavelength ranging from 400 to 700 nm, k1=1.25 and k2=1 for a wavelength of approximately 750 nm, k1=1.6 and k2=1 for a wavelength of approximately 810 nm, k1=3 and k2=1 for a wavelength of approximately 940 nm, and k1=5 and k2=1 for a wavelength ranging from 1060 to 1400 nm.

37. (Original) Apparatus of claim 36, wherein the diverging means comprises a diverging unit provided with at least one focusing lens, a plurality of reflectors and a distally positioned plate transparent to the monochromatic light, each of said at least one lens provided with a suitable focal length so as to focus the monochromatic light onto at least one of said reflectors, each of said reflectors positioned so as to allow light rays to

exit said plate at varying angles, depending on the number of times reflected by said plurality of reflectors, whereby to cause said monochromatic light to be divergent.

38. (Original) Apparatus of claim 36, wherein the diverging means is also a scattering means.

39. (Original) Apparatus of claim 38, wherein the scattering means comprises a diffusing unit attachable to the distal end of the monochromatic light source, said diffusing unit including at least one diffusively transmitting element that is transparent to essentially coherent monochromatic light.

40. (Original) Apparatus of claim 38, wherein the scattering means comprises a diffusing unit attachable to the distal end of the monochromatic light source, said diffusing unit including an angular beam expander and at least one diffuser.

41. (Currently Amended) Apparatus ~~of claim 38, wherein the scattering means comprises~~ for improving bodily safety of bystanders exposed to a monochromatic light source, comprising a diffusing unit attachable to ~~the distal end of the~~ a monochromatic light source distal end, said diffusing unit comprising a plurality of diffusers wherein at least one of said diffusers is axially displaceable, such that at an active position the plurality of diffusers are substantially in contact one with the other at a ~~the~~ first position of said ~~the~~ distal end relative to a target at which ~~of the monochromatic light source, and~~ the energy density of an exit beam from said distal end ~~diffusing unit~~ is substantially equal to the energy density of the monochromatic light, and at an inactive position each of said diffusers is separated one from the other by a gap such that the energy density of the light emitted from the diffusing unit at a second position of said distal end relative to a target is significantly less than the energy density of the monochromatic light ~~at the second position of the distal end of the diffusing unit~~.

42. (Original) Apparatus of claim 36, wherein the first position is substantially in contact with a target to which the monochromatic light is directed.

43. (Canceled) ~~Apparatus of any of claims 36 to 41, wherein the radiance of the divergent monochromatic light is less than 14 J/cm²/sr.~~

44. (Canceled) ~~Apparatus of any of claims 36 to 41, wherein the radiance of the divergent monochromatic light is less than 10*k1*k2*(t{circumflex over ( )}1/3) J/cm²/sr, where t is a laser pulse duration in seconds, k1=k2=1 for a wavelength ranging from 400 to 700 nm, k1=1.25 and k2=1 for a wavelength of approximately 750 nm, k1=1.6 and k2=1 for a wavelength of approximately 810 nm, k1=3 and k2=1 for a wavelength of approximately 940 nm, and k1=5 and k2=1 for a wavelength ranging from 1060 to 1400 nm.~~

45. (Currently Amended) Apparatus of claim 36, wherein the eye hazardous monochromatic light is selected from the group consisting of collimated laser beam, convergent laser beam, concentrated multiple laser beams and fiber guided laser beam.

46. (Currently Amended) Apparatus of claim 36 ~~45~~, wherein the monochromatic light source is selected from the group consisting of Excimer laser, Dye laser, Nd:YAG 1064, 1320 and 1440 nm laser, frequency doubled Nd:YAG laser, Ruby laser, Alexandrite laser, Diode laser including diodes operating at a wavelength of 810 to 830 nm, 940 nm, and 1450 nm, stack of diodes, LICAF laser, Er:Glass laser, Er:YAG laser, Er:YSGG laser, CO_2 laser, isotopic CO_2 laser and Holmium laser ~~units~~.

47. (Currently Amended) Apparatus of claim 36, wherein the monochromatic light is provided with a wavelength ranging from 308 to 1600 nm or between 1750 nm to 11.5 microns and the energy density level of the monochromatic light source ranges from ~~0.01 to 2000~~ 2 to 90 J/cm^2.

48. (Original) Apparatus of claim 36, wherein the monochromatic light source is a plurality of monochromatic diodes.

49. (Original) Apparatus of claim 36, wherein the bodily safety includes eye safety, skin safety and environmental safety.

50. (Canceled) ~~Apparatus of claim 36, wherein the exit beam at the first position is used in applications selected from the group of cosmetic applications, medical applications and industrial applications.~~

51. (Currently Amended) Apparatus of claim 36, wherein the ~~exit beam at the first position is used in applications~~ aesthetic or medical treatment is selected from the group consisting of hair removal, coagulation of blood vessels located on a face or legs, treatment of rosacea, tattoo removal, removal of pigmented lesions in the skin, skin rejuvenation, treatment of psoriasis, treatment of acne, treatment of skin pigmented with porphyrins or Canine green, treatment of fat, skin resurfacing, skin vaporization, collagen contraction, dental applications, removal of pigments from the gums, teeth whitening, dermatology, gynecology, podiatry, urology, and reduction of pain~~, laser welding of transparent plastic materials, surface treating of materials, laser annealing, evaporation of paint and ink stains and cleaning of buildings, stones, antique sculptures and pottery~~.

52. (Currently Amended) Apparatus of claim 46, wherein the duration of a laser pulse ranges from ~~1 nanosecond~~ 10 nanoseconds to 1500 msec, the energy density level of the monochromatic light source ranges from 2 to 90 J/cm^2, and the diverging means has a width of greater than 3 mm.

53. (Canceled) ~~Apparatus of claim 46, wherein the laser unit is provided with a power level ranging from 1 to 2000 W, when under continuously working operation~~.

54. (Currently Amended) Apparatus of claim 39, wherein the material of each diffusively transmitting element is selected from the group consisting of silica, glass, sapphire, diamond, non-absorbing polymer, light diffusing polymer, polycarbonate, acrylic, densely packed fibers, NaCl, CaF_2, glass, ZnSe and BaF_2.

55. (Canceled) ~~Apparatus of claim 39, wherein the diffusing unit is further provided with a clear transmitting element distal to a diffusively transmitting element, the diffusively transmitting element and clear transmitting elements being mutually parallel and perpendicular to the longitudinal axis of the diffusing unit.~~

56. (Canceled) ~~Apparatus of claim 55, wherein the clear transmitting element is made of a material selected from the group of glass, sapphire, transparent polymer including polycarbonate and acrylic, BaF_2, NaCl and ZnF_2~~.

57. (Currently Amended) Apparatus ~~of claim 55,~~ for improving bodily safety of bystanders exposed to a monochromatic light source, comprising scattering means attached to the distal end of an eye hazardous monochromatic light source, whereby at a first position of said distal end relative to, and substantially in contact with, a target the energy density of an exit beam from said scattering means is substantially equal to the energy density of the eye hazardous monochromatic light and at a second position of said distal end relative to a target the energy density of the light emitted from said scattering means is significantly less than the energy density of the eye hazardous monochromatic light,

wherein the scattering means comprises a diffusing unit attachable to the distal end of the eye hazardous monochromatic light source, said diffusing unit comprising at least one diffusively transmitting element that is transparent to essentially coherent monochromatic light and a clear transmitting element proximal to a diffusively transmitting element, the diffusively transmitting element and clear transmitting elements being mutually parallel and perpendicular to the longitudinal axis of the diffusing unit,

wherein a gap between the diffusively transmitting and clear transmitting elements is less than 2 mm.

58. (Original) Apparatus of claim 39, wherein each diffusively transmitting element is provided with a plurality of irregularities which are randomly distributed thereabout.

59. (Original) Apparatus of claim 39, wherein the diffusively transmitting element is formed by a diffraction pattern or by a randomly distributed array of thin fibers.

60. (Original) Apparatus of claim 40, wherein the diffusing unit further comprises at least one light guide, each of said light guides being provided with internally reflecting walls and an exit surface.

61. (Original) Apparatus of claim 60, wherein a light guide is tapered.

62. (Currently Amended) Apparatus of claim 60, wherein a light guide is made of a material selected from the group consisting of solid glass, sapphire, plastic and liquid dielectric material.

63. (Original) Apparatus of claim 60, further comprising an optical element which increases the divergence angle of monochromatic light and a diffuser which receives light from said optical element and emits said received light to the light guide, the exit surface of said light guide functioning as a wide angle extended diffuser source.

64. (Original) Apparatus of claim 39, further comprising a plurality of reflectors, the angular disposition and distance of each reflector relative to the diffusing unit being repositionable, whereby to accurately direct the monochromatic light to a selected target on the diffusively transmitting element.

65. (Original) Apparatus of claim 64, further comprising a processor, said processor suitable for the programming of the sequence of targets to be impinged by the monochromatic light.

66. (Original) Apparatus of claim 39, further comprising a scanner for rapid repositioning of the monochromatic light to a target on the diffusively transmitting element.

67. (Original) Apparatus of claim 36, wherein the distance between a distal end of the diverging means and the target at the first position of the distal end of the monochromatic light source is the smaller of 2 mm and the diameter of the monochromatic light.

68. (Currently Amended) Apparatus of ~~any of claims 37 to 41~~ claim 36, wherein a unit is attached to the distal end of the monochromatic light source by an attachment means.

69. (Original) Apparatus of claim 68, wherein the unit is fixedly attached to the distal end of the monochromatic light source.

70. (Original) Apparatus of claim 68, wherein the unit is integrally formed together with the distal end of the monochromatic light source during manufacturing, the unit being disposed internally to the outer wall of the monochromatic light source.

71. (Original) Apparatus of claim 68, wherein the attachment means is releasable.

72. (Original) Apparatus of claim 71, wherein the attachment means is permanently attached to the monochromatic light source and displaceable, whereby in one position of a displaceable unit the monochromatic light source is coherent, not propagating through said displaceable unit, and in a second position at which said displaceable unit is attached to the distal end of the monochromatic light source, the monochromatic light is noncoherent, propagating through the displaceable unit.

73. (Original) Apparatus of claim 36, wherein a divergent angle of the divergent monochromatic light is greater than a half angle of 6 degrees.

74. (Original) Apparatus of claim 39, wherein a half angle of a scattered exit beam exceeds 42 degrees.

75. (Currently Amended) Apparatus ~~of claims 37 to 41, further comprising~~ for improving bodily safety of bystanders exposed to an eye hazardous monochromatic light source,

comprising means attached to the distal end of a monochromatic light source which is adapted to cause the monochromatic light to be divergent, whereby at a first position of said distal end relative to, and substantially in contact with, a target the energy density of an exit beam from said diverging means is substantially equal to the energy density of the eye hazardous monochromatic light and at a second position of said distal end relative to a target the energy density of the light emitted from said diverging means is significantly less than the energy density of the eye hazardous monochromatic light, and means to evacuate vapors or particles from said target ~~to thereby prevent a change in optical properties of the unit~~.

76. (Currently Amended) Apparatus of claim 75, wherein the evacuation means is U-shaped in vertical cross-transmission element, to allow for contact with a target at its lateral ends and for evacuation of vapors ~~or particles~~ through a gap formed by its central open region.

77. (Canceled) ~~Apparatus of claim 75, the evacuation means further comprising a relay optics device, whereby to concentrate the exit beam from the unit onto the target~~.

78. (Currently Amended) Apparatus of claim ~~55~~ 57, further comprising ~~a~~ means for skin cooling, said skin cooling means being disposed in the ~~a~~ gap formed between the ~~frosted~~ diffusively transmitting and clear transmitting elements or in contact with one of the diffusively transmitting element and the clear transmitting element, said skin cooling means adapted to reduce the rate of increase of temperature at a target skin location.

79. (Original) Apparatus of claim 36, further comprising a means for measuring the radiance of the divergent monochromatic light, control circuitry in communication with said measuring means and the monochromatic light source, and a warning means in communication with said control circuitry which is activated, as a result of a mishap, if the radiance of the divergent monochromatic light is greater than a predetermined safe value.

80. (Currently Amended) Apparatus ~~of claim 36, further comprising a~~ for improving bodily safety of bystanders exposed to a monochromatic light source, comprising:

a) means attached to the distal end of an eye hazardous monochromatic light source, said means adapted to cause the monochromatic light to be divergent, whereby at a first position of said distal end relative to, and substantially in contact with, a target the energy density of an exit beam from said diverging means is substantially equal to the energy density of the eye hazardous monochromatic light and at a second position of said distal end relative to a target the energy density of the light emitted from said diverging means is significantly less than the energy density of the eye hazardous monochromatic light,

b) means for generating a visible flash; and

c) control circuitry in communication with said means for generating a visible flash and with the monochromatic light source, said control circuitry synchronized such that a flash is generated prior to the emission of each pulse of monochromatic light.

81. (Original) Apparatus of claim 36, wherein the monochromatic light source is one or more arrays of a diode light source.

82. (Canceled) ~~Apparatus for cooling skin which is irradiated with monochromatic light, comprising: a) a monochromatic light source with a distal end; b) a unit attachable to the distal end of the monochromatic light source, said unit being provided with two elements that are transparent to monochromatic light, such that a gap is formed between said two elements; and c) a means for skin cooling insertable within said gap, said skin cooling means adapted to reduce the rate of increase of temperature at a target skin location.~~

83. (Canceled) ~~Apparatus of claim 82, wherein one element is a diffusively transmitting element and the other element is a clear transmitting element distally positioned with respect to said diffusively transmitting element, whereby the energy density of an exit beam from the diffusing unit is substantially equal to the energy density of the monochromatic light upon placement of the diffusing unit at a position adjacent to~~

~~a target skin location and is significantly less than the energy density of the monochromatic light at a distance from said target.~~

84. (Canceled) ~~Apparatus of claim 82, wherein the skin cooling means is a fluid transparent to said monochromatic light, said fluid flowable through a conduit inserted within the gap.~~

85. (Canceled) ~~Apparatus of claim 84, wherein the fluid is in fluid communication with an external cooler.~~

86. (Canceled) ~~Apparatus of claim 84, wherein the fluid is a liquid or a gas.~~

87. (Canceled) ~~Apparatus of claim 82 or 83, wherein the skin cooling means is a thermoelectric cooler, the thermoelectric cooler operative to cool the lateral sides of the element placed adjacent to the skin location to be treated.~~

88. (Canceled) ~~Apparatus of any of claims 82 to 87, further comprising a scanner, said scanner being adapted to rapidly reposition the monochromatic light to a target on the diffusively transmitting element, the skin cooling means capable of continuously cooling the skin at a corresponding target skin location~~.

89. (Canceled) ~~Apparatus for improving eye safety during exposure to a monochromatic light source, comprising: a monochromatic light source, a means for generating a visible flash prior to emission of a monochromatic light, and control circuitry in communication with said means for generating a visible flash~~.

90. (Canceled) ~~Apparatus of claim 89, wherein the control circuitry is synchronized such that the flash is generated prior to the emission of each pulse of monochromatic light, thereby inducing an eye of a bystander to blink or to change its field of view in order to avoid staring at the monochromatic light~~.

91. (Canceled) ~~Apparatus of claim 90, wherein the duration of the pulse is shorter than an eye blinking response time~~.

92. (Canceled) ~~Apparatus of claim 89, wherein the monochromatic light source is suitable for hair removal, photorejuvenation or treatment of vascular lesions~~.

93. (New) Apparatus of claim 57, wherein the clear transmitting element is made of a material selected from the group of glass, sapphire, transparent polymer including polycarbonate and acrylic, BaF_2, NaCl and ZnF_2.

94. (New) Apparatius of claim 78, wherein the skin cooling means is a fluid transparent to the monochromatic light and flowable through a conduit inserted within the gap.

95. (New) Apparatus of claim 94, wherein the fluid is in fluid communication with an external cooler.

96. (New) Apparatus of claim 94, wherein the fluid is a liquid or a gas.

97. (New) Apparatus of claim 78, wherein the skin cooling means is a thermoelectric cooler, said thermoelectric cooler operative to cool lateral sides of a clear transmitting element which is positioned at a predetermined location substantially in contact with an outer surface of the skin target.

98. (New) Apparatus of claim 78, further comprising a scanner for rapid repositioning of the monochromatic light to a target on the diffusively transmitting element, the skin cooling means capable of continuously cooling the skin at a corresponding skin location.

99. (New) Apparatus of claim 75, wherein the diverging means is provided with at least one focusing lens, a plurality of reflectors and a distally positioned plate transparent

to the monochromatic light, each of said at least one lens provided with a suitable focal length so as to focus the monochromatic light onto at least one of said reflectors, each of said reflectors positioned so as to allow light rays to exit said plate at varying angles, depending on the number of times reflected by said plurality of reflectors, whereby to cause said monochromatic light to be divergent.

100. (New) Apparatus according to claim 75, wherein the diverging means is also a scattering means, said scattering means comprising a diffusing unit attachable to the distal end of the monochromatic light source, said diffusing unit including at least one diffusively transmitting element that is transparent to essentially coherent monochromatic light.

101. (New) Apparatus according to claim 75, wherein the evacuation means is interposed between the diverging means and the target.

102. (New) Apparatus of claim 76, wherein the target of the exit beam from the distal end is a skin target and the monochromatic light is pulsed light having a wavelength ranging from 308 to 1600 nm, an energy density ranging from 0.1 to 200 J/cm^2 which is suitable for the non-ablative treatment of skin lesions located under the outer surface of said skin target, and a pulse duration ranging from 10 nanoseconds to 1500 msec.

103. (New) Apparatus of claim 76, further comprising skin cooling means, said skin cooling means adapted to reduce the rate of increase of temperature at a target skin location.

104. (New) Apparatus of claim 100, wherein the diffusing unit further comprises a clear transmitting element proximal to a diffusively transmitting element, the diffusively transmitting element and clear transmitting elements being mutually parallel and perpendicular to the longitudinal axis of the diffusing unit, a gap between the diffusively transmitting and clear transmitting elements being less than 20 mm.

105. (New) Apparatus of claim 104, wherein the gap is less than 2 mm.

106. (New) Apparatus of claim 102, wherein the energy density level of the monochromatic light is adjustable to a level which is sufficient for the temporal spectral absorption of a subcutaneous skin target and the pulse duration of the monochromatic light is adjustable in accordance with the color or skin type of the skin target, the monochromatic light source being selected from the group of Excimer laser, Dye laser, Nd:YAG 1064, 1320 and 1440 nm laser, frequency doubled Nd:YAG laser, Ruby laser, Alexandrite laser, Diode laser operating at a wavelength of 810 to 830 nm, 940 nm, and 1450 nm, stack of diodes, LICAF, and an intense pulsed light source.

107. (New) Apparatus of claim 106, wherein the monochromatic light is suitable for effecting a treatment selected from the group of hair removal, skin rejuvenation, collagen contraction, treatment of acne, treatment of skin pigmented with porphyrins or Cyanine green, treatment of herpes, and removal of pigmented lesions in the skin.

108. (New) Apparatus of claim 106, wherein the light source and evacuation means are housed in a common handpiece.

109. (New) Apparatus of claim 108, wherein the evacuation means is releasably attachable to the handpiece.

110. (New) Apparatus of claim 46, wherein the light source is housed in a handpiece.

111. (New) Method of claim 12, wherein the aesthetic or medical treatment is effected when the monochromatic light source is housed in a handpiece.

112. (New) Method of claim 20, comprising the steps of:

a) providing a diffusing unit comprising a diffusively transmitting element and a clear transmitting element proximal to said diffusively transmitting element, the diffusively transmitting element and clear transmitting elements being transparent

to the monochromatic light and being mutually parallel and perpendicular to the longitudinal axis of the diffusing unit;,

b) positioning said clear transmitting element at a predetermined location above an outer surface of a target which is suitable for effecting the treatment;

c) providing means for skin cooling, said skin cooling means being disposed in a gap formed between the diffusively transmitting and clear transmitting elements or in contact with one of the diffusively transmitting element and the clear transmitting element;

d) firing the monochromatic treatment light; and

e) allowing said skin cooling means to cool said target.

113. (New) Method of claim 112, wherein the gap formed between the diffusively transmitting and clear transmitting elements is less than 2 mm.

114. (New) Method of claim 112, wherein the skin cooling means is a fluid transparent to the monochromatic light and flowable through a conduit inserted within the gap.

115. (New) Method of claim 114, wherein the fluid is in fluid communication with an external cooler.

116. (New) Method of claim 112, wherein the skin cooling means is a thermoelectric cooler, said thermoelectric cooler operative to cool lateral sides of the clear transmitting element which is positioned at a predetermined location substantially in contact with an outer surface of the skin target.

117. (New) Method of claim 1, further comprising the steps of:

a) positioning a U-shaped evacuation chamber between the diffusing unit and the target such that its lateral ends are in contact with the target;

b) evacuating vapors from said evacuation chamber through a gap formed by its central open region; and

c) firing the monochromatic treatment light source.

118. (New) Method of claim 117, further comprising the step of moistening the outer surface of a skin target with water or gel prior to the step of firing the monochromatic light source.

119. (New) Method for laser welding, comprising:

a) providing an eye-hazardous monochromatic welding light source;
b) providing a diffusing unit comprising at least one diffusively transmitting element which is transparent to said light and constitutes an extended diffused source when exposed to said light;
c) attaching said diffusing unit to the distal end of a body of said light source;
d) applying welding material to a target;
e) positioning the distal end of said body at a predetermined location substantially in contact with said target;
f) setting the energy density and pulse duration of monochromatic light exiting the distal end in accordance with properties of an element to be welded including its spectral properties, size, and depth from upper surface; and
g) firing the light source for a sufficient period of time to allow said element to be welded.

120. (New) Method for surface treatment of materials, comprising:

a) providing an eye-hazardous monochromatic material surface treatment light source;
b) providing a diffusing unit comprising at least one diffusively transmitting element which is transparent to said light and constitutes an extended diffused source when exposed to said light;
c) attaching said diffusing unit to the distal end of a body of said light source;
d) positioning the distal end of the body at a predetermined location substantially in contact with a target selected from the group of paint or ink stains, a metallic coating, buildings, stones, antique sculptures and pottery; and

e) firing the light source for a sufficient period of time to allow said target to be ablated.